EXPRESSIVITY OF THE MAIN QUANTITATIVE CHARACTERS IN THE PEPPER VARIETY *IȘALNIȚA 85 V* ON THE SANDY SOILS OF SCDCPN DĂBULENI

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Abstract

Bell pepper (Capsicum annuum var. grossum) is an important and valuable legume species, cultivated worldwide. Bell pepper is used for culinary purposes, but can also be consumed fresh or used as a spice or food coloring.

In Romania, bell peppers are the fourth most important crop in terms of production, after cabbage, tomato and onion. In Romania, peppers are mainly grown by small farmers to ensure a sustainable livelihood. The Dăbuleni Research and Development Station for Plant Culture on the Sands (SCDCPN) has been studying numerous vegetable species, including bell peppers, since 1959. At SCDCPN Dăbuleni, the breeding activity for bell peppers aims to maintain our own varieties at the quantitative and qualitative parameters at the time of homologation, but also to create new varieties by using local populations in the breeding process. The aim of this work was to study the expressiveness of the main characteristics of the bell pepper variety Ișalnița 85 V, over a period of 3 years. The bell pepper variety Ișalnița 85 V was subjected to an analysis of the variability of the main quantitative characters of the fruits: fruit weight (g), fruit diameter (cm), pericarp thickness (mm) and I.F (shape index). Currently, the variety is in a process of conservative selection and it is important to evaluate the expressiveness of the main characteristics in order to maintain it within optimal parameters and, at the same time, to preserve the purity of the variety.

Key words: Capsicum annuum var. grossum, variability, quantitative characteristics, statistical indices.

INTRODUCTION

Bell pepper (Capsicum annuum L.) is a plant of the *Solanaceae* family, native to Mexico, Central America and northern South America (Echer et al., 2002; Filgueira, 2003; Souza et al., 2011). It is an important crop in many parts of the world, given its economic importance, ranking second in world production. It is considered one of the ten species with the greatest economic importance in the Brazilian vegetable market, and the area cultivated annually is approximately 13 million hectares, with a production of almost 290 million tons of fruit, generally grown in open fields (Marouelli and Silva, 2012).

Bell pepper is a popular vegetable for its delicate taste and pleasant aroma, combined with its high nutritional value and anti-inflammatory compounds (Marin et al., 2004).

The color and shape of the fruit determine the market value of the product. At the same time, bell pepper fruits are used as a spice, as well as for medicinal purposes, being rich in vitamins A and C. In addition, they are used as natural coloring agents in cosmetics and as active ingredients in host

defense repellents (Van Zonneveld and al., 2015).

In Romania, bell pepper ranks fourth in terms of production, after cabbage, tomato and onion. (Vînătoru et al., 2014). At the national level, pepper is cultivated mainly by small farmers to ensure a sustainable livelihood.

The Dăbuleni Research and Development Station for Plant Culture on Sands (SCDCPN) has been intensively studying numerous vegetable species, including bell peppers, since 1959.

At SCDCPN Dăbuleni, the breeding activity for bell peppers aims to maintain our own varieties at the quantitative and qualitative parameters at the time of homologation, but also to create new varieties by using local populations in the breeding process. However, over the years, due to the lack of conservative selection, the absence of a coherent breeding program, and the introduction of new pepper varieties, local varieties have been aggressively exposed to genetic erosion, reaching the point where they have almost lost their identity (Barcanu-Tudor et al., 2019).

There are few plant breeding methods aimed at enriching nutritional values in tropical and subtropical areas, where bell pepper cultivation remains limited and is grown sporadically in open field conditions. Bell peppers possess a wide range of genetic variability, although this advantage has not been fully evaluated and utilized to develop improved varieties/hybrids for use in tropical and subtropical areas.

This breeding approach continues to be the reference method for improving yield and economically important traits.

The purpose of this work was to study the expressiveness of the main characteristics of the bell pepper variety Ișalnita 85 V, over a period of 3 years.

Currently, the variety is in a process of conservative selection and it is important to evaluate the expressiveness of the main characteristics in order to maintain it within optimal parameters and, at the same time, to preserve the purity of the variety.

MATERIALS AND METHODS

The research was conducted between 2023-2025 at the Dăbuleni Research and Development Station for Plant Culture on Sands, where the behavior of the *Ișalnița 85 V* bell pepper variety in the open field was studied**.**

The bell pepper variety studied, Ișalnița 85 V, was sown in alveolar cubes filled with peat on March 15, 2023, March 15, 2024, and March 26, 2025, respectively, and was planted on May 8, 2023, May 2, 2024, and May 2, 2025, respectively, at a distance of 30 cm between plants per row and 70 cm between rows.

The bell pepper variety obtained as a result of the breeding process was subjected to rigorous selection, in order to stabilize the characters. The selection of the variety was made according to the phenotypic manifestation of the main quantitative characters that characterize each genotype. The bell pepper variety Ișalnița 85 V was subjected to an analysis regarding the variability of the main quantitative characters of the fruits: fruit weight (g), fruit height (cm), fruit diameter (cm), pericarp thickness (mm).

Biometric and phenological observations were carried out during the vegetation period, over a period of 3 years (2023-2025). Qualitative characters were noted based on visual assessment, while quantitative traits were counted, measured using metric rulers, a caliper and weighed with a precision balance.

The recorded biometric data were statistically processed using the Data Analysis program, calculating for each analyzed character the mean ($\bar{x}$), standard deviation (s), coefficient of variability (s%), and degree of dispersion ($k= \bar{x} \pm s$).

RESULTS AND DISCUSSIONS

Characterizing and conserving genetic diversity in vegetable species remains essential for supporting the productivity and resilience of agricultural systems. Genetic erosion is a significant threat, as traditional landraces serve as key genetic resources, with adaptations that have been

selected by researchers over generations. Following the studies carried out in 2023-2025, the aim was to maintain the authenticity and biological uniformity of the *Işalnița 85 V* bell pepper variety. The results obtained for the *Işalnița 85 V* bell pepper variety regarding fruit weight variability are presented in Table 1. In the bell pepper genotype *Işalnița 85 V*, in the three years of study the fruit weight presented a medium variability (17.35%), the average of the character being 88.84 g. This characteristic indicated the economic value of the bell pepper variety. The degree of dispersion of the individual values recorded close values in the three years of study (S%= 15.15-18.98) for the bell pepper variety *Işalnița 85 V*, which indicates a good uniformity of the fruits in terms of their weight.

Table 1. Variability of fruit weight (g) in the bell pepper variety *Işalnița 85 V*

Statistical indices	The years			Average years
	2023	2024	2025	
Average x̄	110.7	76.16	79.58	88.84
Standard deviation s	21.02	11.54	14.26	15.61
Coefficient of variability s%	18.98	15.15	17.92	17.35
Variability range k = x̄± s	89.75-131.80	64.62-87.70	65.32-93.84	73.23-104.45

Figure 1. Bell pepper variety *Işalnița 85 V*

The fruit height (cm) of the bell pepper variety Işalnița 85 V varies between 8.31 and 9.65 cm, with an average of 8.97 cm. The fruits are very uniform in terms of this character, with a medium coefficient of variability (12.69%), and a standard deviation of 0.99-1.35.

Table 2. Variability of fruit height (cm) in the bell pepper variety Işalnița 85 V

Statistical indices	The years			Average years
	2023	2024	2025	
Average x̄	9.65	8.31	8.93	8.97
Standard deviation s	1.35	1.08	0.99	1.14
Coefficient of variability s%	13.97	12.95	11.13	12.69
Variability range k = x̄± s	8.30-11.00	7.23-9.39	7.93-9.92	7.82-10.11

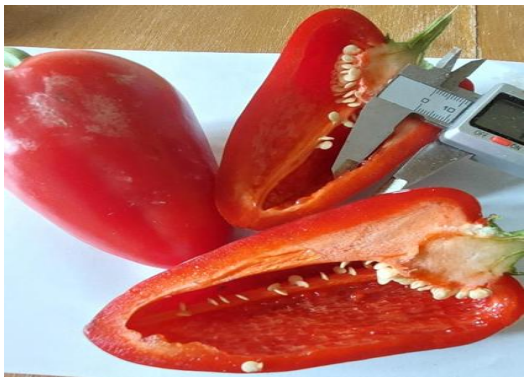

Figure 2. Bell pepper variety Işalnița 85 V

The pericarp thickness (mm) varied between 5.07 mm and 5.50 mm, and in the three years of study the average was 5.24 mm. The fruits were uniform regarding this character, and the value of the coefficient of variability is medium (13.09%) (Table 3). The pericarp thickness confers the quality and firmness of the fruit, being a character that contributes to the achievement of the fruit weight and implicitly to the increase in the productivity of the genotype. This is a defining character for the selection and maintenance in a pure state of the bell pepper variety Işalnița 85 V. Also, this character can be improved by choosing representative fruits regarding the thickness of the pericarp.

Table 3. Variability of pericarp thickness (mm) in the bell pepper variety *Işalnița 85 V*

Statistical indices	The years			Averag e years
	2023	2024	2025	
Average x̄	5.50	5.15	5.07	5.24
Standard deviation s	0.80	0.61	0.65	0.69
Coefficient of variability s%	14.54	11.79	12.93	13.09
Variability range k = x̄± s	4.70-6.29	4.54-5.75	4.41-5.72	4.55-5.92

The fruit diameter (cm) varies between 5.60 cm and 6.73 cm, with an average of 6.17 cm. The fruits were uniform in terms of this character, and the coefficient of variability value is medium (11.05%).

Figure 3. Aspects from the experimental field

Table 4. Variability of fruit diameter (cm) in the bell pepper variety *Işalnița 85 V*

Statistical indices	The years			Average years
	2023	2024	2025	
Average x̄	6.17	6.73	5.60	6.17
Standard deviation s	0.90	0.70	4.65	2.09
Coefficient of variability s%	14.53	10.38	8.32	11.05
Coefficient of variability s%	5.27-7.06	6.03-7.43	5.13-6.06	5.48-6.85

CONCLUSIONS

To maintain the Işalnița 85 V bell pepper variety over time, conservative selection protects valuable genetic diversity, which can be used for future breeding programs.

The calculation and analysis of the variability of the studied characters in the Işalnița 85 V bell pepper variety, highlighted on average over the three years of study a medium variability for all the analyzed characters (fruit diameter (cm) - 11.05%; fruit height (cm) - 12.69%; pericarp thickness (mm) - 13.09% and fruit weight (g) - 17.35%).

In order to maintain the authenticity and biological uniformity of the Işalnița 85 V bell pepper variety, the aim was to restrict the variability of the main analyzed characters within the limits of small and medium coefficients of variation.

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